Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

choices arbitrary and irrational, though I can see that they may very well appear so to an intellectualist: for, after all, the alternatives may spring from an equality of reasons. I should only regard them as excellently illustrating the 'primacy of will,' and so am not disposed to resent their existence. But for reasons of which I have stated some above, I doubt whether we have yet come anywhere near this ultimate ground of personal choice in the pragmatic controversy. If, however, Professor Russell should think otherwise, I too am quite content to let the matter rest in its present posture.

F. C. S. SCHILLER.

CORPUS CHRISTI COLLEGE, OXFORD.

REVIEWS AND ABSTRACTS OF LITERATURE

The Development of Symbolic Logic: a Critical-historical Study of the Logical Calculus. A. T. SHEARMAN. London: Williams & Norgate. 1906. Pp. 242.

In the preface the author states that "the form that the present work has taken is due to some correspondence which I had with Mr. W. E. Johnson in the year 1903. He pointed out to me the error of thinking of the various symbolic systems as being radically distinct, and as competing with one another for general acceptance. Rather, he held, it is correct to adopt the view that there is available at the present time what may be called *the* logical calculus, and that towards the creation of this calculus most symbolists have contributed.

"This idea has been worked out in the following pages. I have traced the growth of the subject from the time when Boole originated his generalization to the time when Mr. Russell, pursuing for the most part the lines laid down by Peano, showed how to deal with a vastly wider range of problems than Boole ever considered. My attention has been occupied, that is to say, upon the questions to whom we are most indebted for those rules of procedure that may be said now to constitute the calculus, what important differences of opinion have arisen as the subject has been gradually thought out, and which of the conflicting views we find it correct to adopt. The investigation has thus been quite as much critical as historical, for, in demonstrating who have contributed to the creation of the logical calculus, it has been necessary constantly to point out, in the first place, why certain views have to be rejected as being incorrect, and secondly, wherein one of two suggestions, both of which are excellent, shows an advance upon the other.

"Portions of some of the chapters have appeared in a paper which has been published in the *Proceedings of the Aristotelian Society.*"

To quote Mr. Shearman again, his order of exposition is as follows:

"In the first three chapters I suppose that we are confronted with a complicated set of premises and are required to draw a certain conclusion from them, or that we are given a certain conclusion and are required to assign premises from which it may have been drawn. At each stage in the solution I shall endeavor to show which logician it is who has proposed the best method of procedure to be adopted at that point. In this way I hope to make clear that there has been real development from the time of Boole, and that the principal contributors to the development are Venn, Schroeder, Keynes, Johnson, Mitchell, C. Ladd-Franklin and Peirce.

"Then in Chapter IV. I prove that those who have been engaged in elaborating the calculus were justified in proceeding by way of an extensive rather than by way of an intensive interpretation of the proposition." Chapter V. is occupied with Jevons and MacColl, both of whom 'have, indeed, proceeded by way of extension, but who have, in my opinion, fallen into serious errors.' "Up to this point the investigation is concerned with what may be called the ordinary symbolic logic, and with its ordinary employment. In the next chapter I refer (1) to the logicians who have shown how the principles that are utilized for the manipulation of propositions with single quantifications may also be utilized in the case of double and multiple quantifications; (2) to the view that, though such multiple quantifications may be successfully manipulated, it is not possible to treat copulæ in a general manner, and so arrive at such a logic as the expression 'logic of relatives' naturally suggests to the mind; and (3) to Frege, Peano and Russell, who have shown that, when certain distinctions are made which the older symbolists passed by as unimportant, and when a suitable interpretation is given to the conceptions of quantitative mathematics, both the comprehensiveness and the utility of symbolic logic are greatly increased. Finally, having thus traced the development of the subject, I devote a chapter to the consideration of the uses of symbolic logic, both in its less and in its more extended application."

To turn to a closer view, the first chapter deals with 'Symbols as Representing Terms and as Representing Propositions.' The author holds that, in the case of the problems of the earlier symbolic logic, "it makes no difference, so long as the appropriate rules are observed, whether we let our symbols stand for terms or for propositions. But, when we come to deal with the problems that are not included within the scope of the Boolian treatment, I admit that it is better to let symbols stand primarily for propositions."

Besides the question whether or not symbolic logic deals primarily or exclusively with propositions, is the question to what kind of propositions in any case it must confine itself. The author answers, 'with assertorics only.' Other propositions, *e. g.*, 'the probably true,' are material with which the symbolist has nothing to do. In this case, 'for the simple reason that it does not exist.' The probability of an event can be measured, 'but the probability of the truth of a proposition has no meaning.'

A similar truth holds (as Mr. Johnson has made clear) regarding the manipulation of propositions respecting probabilities. Likewise, to the division (MacColl) of propositions into various classes besides the true and false, the author objects; 'this procedure is based on the fact that the considerations according to which such classifications are reached, all refer to the relation in which the thinker stands to the proposition, and not to the proposition itself.' For such facts new terms must be introduced. They are new propositions.

Chapter II. deals with 'Symbols of Operation.' The author discusses the uses of the symbols $+$, $-$ and $\div$; and defends the use of the latter two. Although the minus sign is not absolutely necessary ('since subduction may always be expressed symbolically as restriction'), it is frequently more convenient to employ this sign. However, the sign is appropriate only as denoting subduction. Regarding the sign $\div$, our author asks, "Has this inverse process any rightful place in symbolic logic, or is it a survival of merely historical interest? I hold that for two reasons the process ought without hesitation to be retained. In the first place, the mental exercise involved in arriving at the comprehension of what is implied in the performance of such inverse operation is, as Venn maintains, of the greatest utility. And, in the second place, the operation is capable of yielding absolutely reliable results."

He next discusses the symbols used to express the indefinite element in the universal affirmative, *e. g.*, $\frac{0}{0}$, showing that in suggestiveness and usefulness there is little difference between them, but adding that $\frac{0}{0}$, if so used, must not be employed (Boole) to represent particular propositions.

How are particulars to be symbolized? Venn's way is best, that is, $xy = v$ or $xy > 0$ (resembling Mrs. Ladd Franklin's xyV). To Venn we owe the recognition of the existential character of particulars, to Mrs. Ladd Franklin a convenient notation of them. The latter logician has not, however, succeeded in giving us formulæ 'that would deal with particulars with as much ease as the formulæ that Boole proposed for universals deal with these.' In short, 'she did not succeed in presenting a general treatment of the subject.'

How may hypotheticals be dealt with? "Venn and Boole can not in their class logic deal generally with the pure hypothetical, for their procedure is to express the premises of an argument as though these in every case denoted class relationship. But if we follow the course adopted by certain other logicians (MacColl, Johnson and Russell) and allow symbols to represent propositions rather than classes, the pure hypothetical can receive adequate treatment."

Chapter III. deals with the 'Process of Solution.' For the direct problem there are two methods, the analytical and the diagrammatic. Regarding the latter, after pointing out the steps forward taken by Keynes, Venn and Marquand, the author adds: "If the symbolist employs diagrams, he is guilty of a somewhat retrograde movement. For in the case of a figure we have to a certain extent *to think* out the answer, whereas a genuine calculus supplies us with a mechanical contrivance by which results may be reached with no other thought than that which is required by a person who manipulates a machine."

In his consideration of the inverse problem, Mr. Shearman points out especially the important contribution of Keynes and of Mr. Johnson. "Mr. Johnson first of all shows clearly that, by a process of multiplying out, the inverse problem may be solved by a direct process, and that we are not, as Jevons maintains we are, here limited to a series of guesses."

One of the most interesting chapters is entitled 'A Calculus Based on Intension.' In this the author first examines Castillon's 'Sur un nouvel algorithme logique,' as being the most consistent attempt to base a calculus upon intension. He finds that Castillon was led into many and serious errors, and that a calculus can not be elaborated in the way he described. His calculus can make use only of universal affirmatives, real particulars (in which 'some' means 'some only') and universal negatives, of which the second and third are inconvertible. Moreover, 'it is not possible consistently to deal with hypotheticals.'

The author's conclusion is not that there can not be a calculus based on intension, but that it would lack naturalness and simplicity and would be far inferior to that which deals with classes directly.

Chapter V. examines the work of Jevons and of MacColl. Great as was Jevons's influence, his reputation 'must not be based upon the fact that he contributed in any important degree to the creation of symbolic logic,' nor has MacColl assisted in erecting this symbolic structure. Where MacColl differs from other symbolists, there he is in error. His 'two chief errors consist in his treatment of modal and kindred propositions, and in his doctrine of logical existence.' "All modal propositions may be reduced to assertorics, and as such symbolic logic deals with them. Again, logical existence is not to be confused with phenomenal existence. There are not two worlds of discourse, but one, and within this two compartments, the real and the unreal." Mr. Shearman's own summary of the following chapter has already been quoted.

The final chapter gives us an eminently fair statement of the utility of symbolic logic, both to education and to science. True, symbolic logic 'does not lead us directly to any new truths in natural science.' This, however, does not mean that no new truth at all is won through its use.

Mr. Shearman's book is not one for a beginner, for it presupposes considerable acquaintance with the work of symbolists, in fact, of all the authors whose work is discussed. However, it is especially valuable at a time, such as the present, when there is great need of taking an account of stock of what has been done in symbolic logic and that in a way that could not be done by giving us one more text-book or treatise.

WALTER T. MARVIN.

PRINCETON UNIVERSITY.